1. ABSTRACT ON INTEGRATED DISEASE MANAGEMENT (IDM) ON YELLOW VEIN MOSAIC DISEASE IN OKRA, CONDUCTED AT KAOCHAO 'E' VILLAGE, SIAHA DISTRICT BY KVK, SIAHA

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Kaochao 'E' village of Siaha district is located just adjacent to Lawngtlai district and is the first village of Siaha district if entered through lawngtlai district. The farmers of this village mostly cultivated mango on a commercial scale which is also their main source of income by the farmers. Apart from mango, the farmers also cultivated different kinds of vegetable crops. However, it was found through baseline survey that the farmers were facing a problem of low yield in okra due to high incidence of infection by Yellow Vein Mosaic Disease in okra. The farming situation in this village was mainly broad based terrace cultivation and river bank cultivation. A frontline demonstration was carried out in Kaochao 'E' village, Siaha District, Mizoram during 2018 – 2019 on Integrated Disease Management (IDM) on Yellow Vein Mosaic Disease in Okra. The technology adopted were Use of IDM resistant variety Arka Anamika and Spray of Chlorpyriphos 2.5ml + neem oil 2ml/lt of water for control of vector *Bemisia tabaci.* The source of technology was taken from Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu.

The yield on demonstration plot was 62q/ha and percentage of disease incidence was 5% only. The gross return and net return in demonstration plot were Rs. 1,86,000/- and Rs. 1,11,000/- respectively. The cost of cultivation in the demonstration plot was Rs. 75,000/-

The yield in farmer's/control plot was only 54q/ha and percentage of disease incidence was 37%. The gross return and net return in demonstration plot were Rs. 1,62,000/- and Rs.82,000/- respectively. The cost of cultivation in the farmers/control plot was Rs. 86,000/-

The overall yield increase percentage was 14.81% and the BC ratio in technology adopted demonstration plot was 2.48 as against 1.88 in farmers/control plot.

The farmers were really impressed by the huge difference in yield and quality of okra in the demonstration plot. Since the technology involved does not require any high technology equipments or machine but could be carried out properly in the local situation without much difficulty by the local farmers, the farmers of kaochao 'E' village and the nearby villages were happy to take up the technology even in the coming years with good results.

Training of farmers and method demonstration on the technology was conducted by Scientist (Plant Protection) of KVK and assistance by means of distribution of resistant variety Arka Anamika as well as distribution of Chlorpyriphos and neem oil for controlling the vector was carried out by KVK, Siaha.

2. ABSTRACT ON MANAGEMENT OF BACTERIAL WILT AND SHOOT AND FRUIT BORER OF BRINJAL CONDUCTED AT LOBO VILLAGE, SIAHA DISTRICT BY KVK, SIAHA

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Lobo is a village in Siaha district whose farmers are hard working and carry out cultivation of different crops like rice, fruits and different kinds of vegetable crops. Among the different types of vegetable crops being cultivated by the farmers, it was found through baseline survey that brinjal crops in this village faced a problem of low yield due to high incidence of shoot and fruit borer (*Leucinodes orbonalis*) and infection by bacterial wilt. The severity of the problem due to shoot and fruit borer and infection by bacterial wilt disease was up to 52% and 38% respectively. Thus, an On Farm Trial was conducted in Lobo village, Siaha District, Mizoram during 2018 – 2019 and 2019-2020 on Management of shoot and fruit borer and bacterial wilt of Brinjal. The technologies adopted for borer were i) Removal of the affected terminal shoot showing boreholes and affected fruits and destroy. ii) Avoidance of synthetic pyrethroids and other insecticides at the time of fruit maturation and harvest. iii) Spraying of Neem seed kernel extract (NSKE) 5 % and spraying of Chlorpyrifos 20 % EC @ 1.0ml/litre starting from one month after planting at 15 days intervals. The technology adopted for wilt were (i) Seed treatment with Streptocycline (1g/40lt of water), (ii) Roguing of wilted plants and the soils surrounding their roots, (iii) Soil fumigation in heavily infested fields, (iv)Soil solarisation and (v) maintaining a spacing of 30 inches plant to plant. The yield on demonstration plot was 250q/ha and percentage of borer and wilt incidence was 9.50 and 6.25 % respectively. The gross return and net return in demonstration plot were Rs. 4,99,000/- and Rs. 2,99,000/- respectively. The total cost of cultivation in the demonstration plot was Rs. 2,00,000/-

The yield in farmer's/control plot was only 173q/ha and percentage of borer and wilt incidence was 47% and 35% respectively. The gross return and net return in demonstration plot were Rs. 3,45,000/- and Rs.1,66,000/- respectively. The total cost of cultivation in the control plot was Rs. 1,80,000/-

The overall yield increase percentage was 44.5% and the BC ratio in technology adopted demonstration plot was 2.48 as against 1.92 in farmers/control plot.

From the results of the demonstration, it was found that the technology adopted for management of borer and wilt proof very successful as compared to the farmer's practice, resulting in increase in yield percentage upto 44.5%. The farmers of Lobo village were really happy to see such an increase in yield and improvement in the quality of brinjal that the farmers of the nearby villages also started to adopt the technology with good results.

Training of farmers and method demonstration on the technology was conducted by Scientist (Plant Protection) of KVK and assistance by means of distribution of critical inputs was carried out by KVK, Siaha. Regular monitoring through field visits, diagnostic visits and field schools were also conducted.

3. ABSTRACT ON MANAGEMENT OF FRUIT BORER AND BACTERIAL WILT OF TOMATO CONDUCTED AT NOAOTLA VILLAGE, SIAHA DISTRICT BY KVK, SIAHA

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The farmers of Noaotla village are mostly farmers and their main income was from cultivation of Strawberry. Besides strawberry, the different types of vegetable crops being cultivated by the farmers were tomato, cabbage, French beans, mustard, grapes, etc. A baseline survey on the different types of problems faced by the farmers was conducted and it was found that the farmers in this village faced a problem of low yield in tomato crop due to high incidence of *Helicoverpa armigera* and infection by bacterial wilt. The severity of the problem due to infection by *H. armigera* and wilt disease was up to 42% and 31% respectively. Thus, frontline demonstration on Management of *H. armigera* and Wilt of Tomato was conducted in Noaotla village, Siaha District, Mizoram during 2018 – 2019 and 2019-2020 respectively. The technology adopted were i) Collection and destruction of the infected fruits and grown up larvae ii) Poison bait with carbaryl 50 WP 1.25 kg, rice bran 12.5 kg, jaggery 1.25 kg and water 7.5 lit/ha iii) Spraying of quinalphos 25 % EC @ 1.0 ml/ litre for fruit borer and Spraying with Streptomycin @ 0.2g/lt of water and Growing of resistant variety Arka Rakshak for wilt.

The yield on demonstration plot was 280q/ha and percentage of wilt incidence was 7% only. The gross return and net return in demonstration plot were Rs. 5,98,000/- and Rs. 3,37,000/- respectively. The total cost of cultivation in the demonstration plot was Rs. 2,41,000/-

The yield in farmer's/control plot was only 230q/ha and percentage of disease incidence was 32%. The gross return and net return in demonstration plot were Rs. 3,00,400/- and Rs.1,33,400/- respectively. The total cost of cultivation in the control plot was Rs. 1,67,000/-

The overall yield increase percentage was 21.7% and the BC ratio in technology adopted demonstration plot was 2.4 as against 1.7 in farmers/control plot. It was found that the technology adopted proof very successful as compared to the farmer's usual practice, resulting in increase in yield percentage up to 21.7%. The farmers of Noaotla village were really happy to see such an increase in yield and improvement in the quality of tomato that the farmers of the nearby villages also started to adopt the technology and also continue to reap good results.

Training of farmers and method demonstration on the technology was conducted by Scientist (Plant Protection) of KVK and assistance by means of distribution of wilt resistant variety Arka Rakshak as well as pesticides was carried out by KVK, Siaha. Regular monitoring through field visits, diagnostic visits and field schools were also conducted.

4. ABSTRACT ON INTEGRATED PEST MANAGEMENT IN RICE AT KIASI VILLAGE, SIAHA DISTRICT BY KVK, SIAHA

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An Integrated Pest Management in Rice was conducted in Mr. K. Beirapilyu's farm in Kiasi village in 2019 – 2020 in collaboration with KVK, Siaha and NCIPM, New Delhi. A proper baseline survey on rice cultivation practices in Kiasi village was carried out in 2018-2019. The major insect pests infesting rice crops were Leaf folder, Stem borer, Rice horned caterpillar & Gundhi bug. The major disease incidence diagnosed were Blast, Brown spot & Sheath blight.

To overcome the problems diagnosed in rice fields, the following interventions were undertaken by KVK in collaboration with ICAR-NCIPM, New Delhi.

1. **Rice Stem borer:** ***Scirpophaga incertulas***
   At ATL, egg parasitoid, *Trichogramma japonicum* was released for the management of the rice yellow stem borer. Besides, Spraying of Neem seed kernel extract as well as clipping of the seedling tips before transplanting to eliminate egg masses and collection and destruction of the egg masses in main field were carried out.
   Spraying of Azadirachtin 0.03% 1000 ml/ha or Carbofuran 3% CG 25 kg/ha or Chlorpyriphos 20% EC 1.25 l/ha and Fipronil 5% SC 1000-1500 g/ha was advised to be carried out only as and when necessary.
2. **Rice Leaf folder :** ***Cnaphalocrocis mainsails***
   Release of *Trichogramma chilonis* @5 cc (1,00,000/ha) thrice at 37, 44 and 51 days
   Keeping the bunds clean.
   Avoidance of excessive nitrogenous fertilizers.
   Spraying of NSKE 5 % or carbaryl 50 WP 1 Kg or chlorpyriphos 20 EC 1250 ml/ ha as and when necessary.
3. **Rice Earhead Bug:** ***Leptocorisa acuta***
   Dusting of Quinalphos at 25 kg/ha twice, the first during flowering and second a week later or Spray Malathion 50 EC 500 ml/ha
4. **Rice Horned Caterpillar:** ***Melanitis ismene***
   Spray the crop with chlorpyriphos 20 EC 1250 ml/ha

The yield on demonstration plot was 37.2q/ha and percentage of incidence of stem borer, leaf folder, gundhi bug and rice horn caterpillar were 6%, 11%, 8% and 5% respectively. The gross return and net return in demonstration plot were Rs. 1,33,920/- and Rs. 83,920/- respectively. The total cost of cultivation in the demonstration plot was Rs. 50,000/-

The yield in farmer's/control plot was only 28.8q/ha and percentage of incidence of stem borer, leaf folder, gundhi bug and rice horn caterpillar were 17%, 29%, 24% and 22% respectively. The gross return and net return in demonstration plot were Rs. 1,02,960/- and Rs.55,960/- respectively. The total cost of cultivation in the control plot was Rs. 47,000/-
The overall yield increase percentage was 29.1% and the BC ratio in technology adopted demonstration plot was 2.67 as against 2.19 in farmers/control plot.

Training of farmers, method demonstrations and supply of IPM equipments and materials as well as parasitoids and pesticides could be carried out through collaborations with ICAR-NCIPM, New Delhi, which was highly appreciated by the farmers. Many farmers of this village also conducted these technologies with huge success.

5. ABSTRACT ON INTEGRATED PEST MANAGEMENT IN CABBAGE, CONDUCTED AT PHURA VILLAGE, SIAHA DISTRICT BY KVK, SIAHA

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Proper baseline survey on existing pests and diseases as well as beneficial insects were carried out during 2019-2020 and 2020-2021. The major pests infesting the crops were Whiteflies, Thrips, Leaf Miner, Aphids, Leaf Webbers, Cabbage Butterfly, Brinjal Shoot and Fruit Borer, Red Pumpkin Beetle and Tobacco Caterpillar. Some of the diseases diagnosed in the field were Wilt disease, Fusarium and Verticillium, Anthracnose, Downy mildew, Mosaic Virus, Rusts and Powdery Mildew.

To overcome the problems diagnosed in Phura village, the following interventions were undertaken by KVK in collaboration with ICAR-NCIPM, New Delhi.

1. Cultural practices : Summer ploughing, selection of healthy seeds, timely planting, raising of healthy nursery, removal of weed from field, balanced use of fertilizers as per recommendations are followed.
2. Mechanical practices: Removal and destruction of pest infested plant parts, hand picking of larvae, collection of egg masses and larvae of pests and their placement in bamboo cages for conservation for bio-control agents.
3. Biological control practices: Bio-control agents like Coccinelids, spiders, damsel flies, dragonflies, etc. were conserved.
4. Behavioral control: Pheromone traps were installed @ 20traps/ha.
5. Chemical Control: Need based application of pesticides
6. **IPM for *Spodoptera litura*** :

a) Destruction of egg masses

b) Poison bait rice bran 5kg + mollase 500g/3 lits of water + Carbaryl 500g /lit of water

c) Chlorpyriphos 2ml/litre or Dichlorvos 1ml/lit of water

The yield on demonstration plot was 175q/ha and percentage of cabbage head borer, aphids, *Spodoptera litura* and cabbage butterfly were 5%, 11%, 7% and 6% respectively. The gross return and net return in demonstration plot were Rs. 3,50,000/- and Rs. 3,25,000/- respectively. The total cost of cultivation in the demonstration plot was Rs. 90,000/-

The yield in farmer's/control plot was only 123q/ha and percentage of cabbage head borer, aphids, *Spodoptera litura* and cabbage butterfly were 18%, 31%, 28% and 22% respectively. The gross return and net return in demonstration plot were Rs. 2,46,000/- and Rs.1,61,000/- respectively. The total cost of cultivation in the control plot was Rs. 85,000/-

The overall yield increase percentage was 29.7% and the BC ratio in technology adopted demonstration plot was 3.88 as against 2.89 in farmers/control plot.

Training of farmers, method demonstrations and supply of IPM equipments and materials and pesticides could be carried out through collaborations with ICAR-NCIPM, New Delhi, which was highly appreciated by the farmers. Many farmers of this village also conducted these technologies with huge success.